

**CLAIMS**

**I claim:**

1. An explosion-proof instrument quick disconnect and seal for use in hazardous environments, comprising:

5 a first portion having a first bore extending therethrough from a proximal end to a distal end;

a second portion detachably coupled to the first portion and having a second bore extending therethrough from a first end to a second end, the second end of the second portion being received within the first bore of the first portion to define an 10 explosion-proof chamber within the first and second portions when the first and second portions are coupled to one another;

a first electrical insert having electrical contacts positioned within the first bore of the first portion; and

15 a second electrical insert having electrical contacts positioned within the second bore of the second portion;

wherein each of the electrical contacts in the first electrical insert engage and form an electrical connection with a respective electrical contact in the second electrical insert within the explosion-proof chamber when the first and second portions are coupled to one another.

2. The explosion-proof instrument quick disconnect and seal according to claim 1, further comprising a coupling having a third bore therethrough, the coupling rotatably positioned on the second portion and having threads formed within the third bore for engaging mating threads formed on the first portion to 5 detachably couple the first portion to the second portion.

3. The explosion-proof instrument quick disconnect and seal according to claim 2, wherein rotation of the coupling in a first direction causes the first portion to move longitudinally toward the second portion to electrically connect the respective contacts of the first and second electrical inserts, and wherein rotation of 10 the coupling nut in the opposite direction causes the first portion to move longitudinally away from the second portion to electrically disconnect the respective contacts of the first and second electrical inserts.

4. The explosion-proof instrument quick disconnect and seal according to claim 3, wherein a predetermined number of threads on the first portion 15 and coupling must engage before electrical connection of the respective contacts of the first and second inserts.

5. The explosion-proof instrument quick disconnect and seal according to claim 4, wherein the predetermined number of threads is at least approximately five threads.

6. The explosion-proof instrument quick disconnect and seal according to claim 2, wherein the coupling is made from stainless steel.

7. The explosion-proof instrument quick disconnect and seal according to claim 1, wherein the electrical inserts are made of non-electrically 5 conductive material.

8. The explosion-proof instrument quick disconnect and seal according to claim 1, wherein the contacts in the first insert are electrically conductive pins and the contacts in the second insert are electrically conductive sleeves for receiving a respective electrically conductive pin.

10 9. The explosion-proof instrument quick disconnect and seal according to claim 8, wherein one of the contacts in the first insert is a ground pin that is longer than the remaining pins to ensure that the quick disconnect and seal is grounded before the remaining pins are electrically connected to the respective sleeves in the second insert and remains grounded until after the remaining pins are electrically disconnected from the respective sleeves in the second insert.

15 10. The explosion-proof instrument quick disconnect and seal according to claim 1, wherein each of the contacts in the first and second inserts is electrically connected to a respective electrical conductor.

11. The explosion-proof instrument quick disconnect and seal according to claim 10, wherein the electrical conductor is soldered to a respective contact in the first or second inserts.

5 12. The explosion-proof instrument quick disconnect and seal according to claim 10, wherein the electrical conductor is crimped to a respective contact in the first or second inserts.

10 13. The explosion-proof instrument quick disconnect and seal according to claim 10, wherein the electrical conductors connected to the contacts of the first insert extend out of the first bore and through the distal end of the first portion, the quick disconnect and seal further comprising a seal within the first bore to prevent gases or vapors from passing between the explosion-proof chamber and out the distal end of the first portion.

14. The explosion-proof instrument quick disconnect and seal according to claim 13, wherein the seal is made from a sealing compound.

15 15. The explosion-proof instrument quick disconnect and seal according to claim 10, wherein the electrical conductors connected to the contacts of the second insert extend out of the second bore and through the second end of the second portion, the quick disconnect and seal further comprising a seal within the second bore to prevent gases or vapors from passing between the explosion-proof chamber and out the first end of the second portion.

16. The explosion-proof instrument quick disconnect and seal according to claim 15, wherein the seal is made from a sealing compound.

17. The explosion-proof instrument quick disconnect and seal according to claim 1, wherein the first and second portions are made from stainless steel.

18. The explosion-proof instrument quick disconnect and seal according to claim 1, wherein each end of the quick disconnect and seal is connected to an adjoining conduit.

19. The explosion-proof instrument quick disconnect and seal according to claim 1, wherein a plurality of threads are formed on the distal end of the first portion for detachably engaging mating threads formed in an adjoining conduit.

20. The explosion-proof instrument quick disconnect and seal according to claim 1, further comprising a union rotatably positioned on an end of the quick disconnect and seal for connecting the quick disconnect and seal to an adjoining conduit.

21. The explosion-proof instrument quick disconnect and seal according to claim 20, wherein the union is rotatably positioned on the first end of the female portion.

22. The explosion-proof instrument quick disconnect and seal according to claim 20, wherein the union comprises a plurality of threads for detachably engaging mating threads formed in the conduit.

5 23. The explosion-proof instrument quick disconnect and seal according to claim 20, wherein the union is made from stainless steel.

10 24. The explosion-proof instrument quick disconnect and seal according to claim 1, further comprising a locating pin extending from the proximal end of the first portion, the locating pin being received within a hole formed in the second end of the second portion to facilitate proper alignment of the respective contacts in the first and second inserts.

25. The explosion-proof instrument quick disconnect and seal according to claim 1, further comprising a seal positioned between the first and second portions to prevent gases or vapors from entering the quick disconnect and seal.

15 26. The explosion-proof instrument quick disconnect and seal according to claim 25, wherein the seal is an O-ring positioned within a groove formed in the exterior of the second portion.

27. The explosion-proof instrument quick disconnect and seal according to claim 1, wherein the first and second portions may be coupled to one without interrupting the power supply to the contacts of the first or second inserts.

28. The explosion-proof instrument quick disconnect and seal according to claim 1, wherein the first and second portions may be detached from one without first interrupting the power supply to the contacts of the first or second inserts.